Geographic Information System-based Safety Analysis, Visualization, and Exploration Resource (GIS-SAVER)

for

Engineering, Enforcement, Education, Emergency response, and Everyone else!

(GIS-SAVER:E^5)
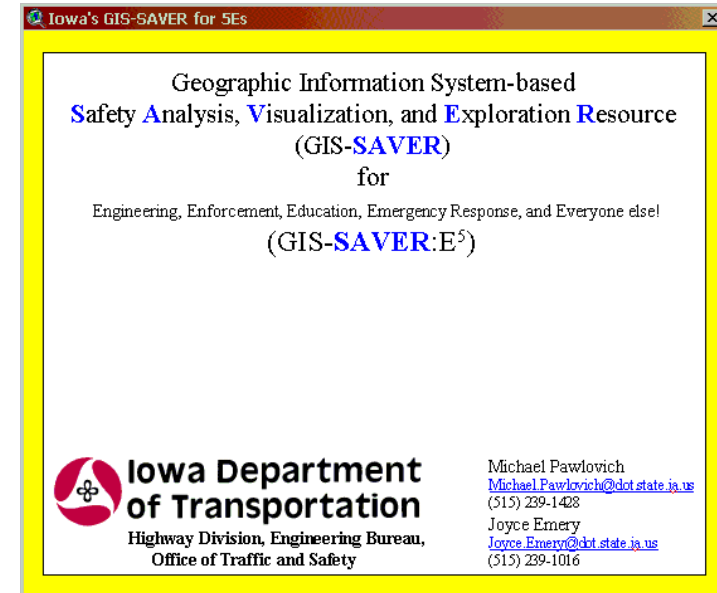
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Marion TraCS Data Examples (MARS data)

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Safety **A**nalysis, **V**isualization, and **E**xploration **R**esource
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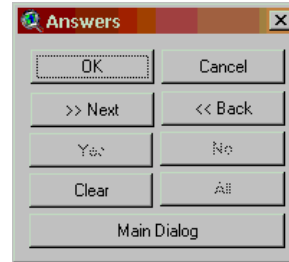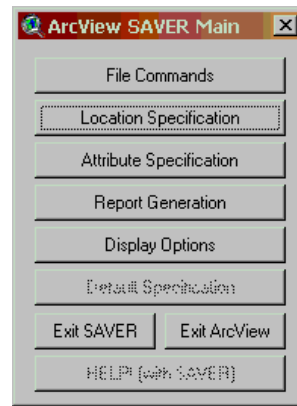Technical: Michael D. Pawlovich
Michael.Pawlovich@dot.state.ia.us
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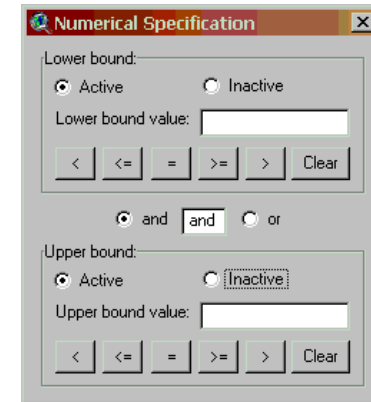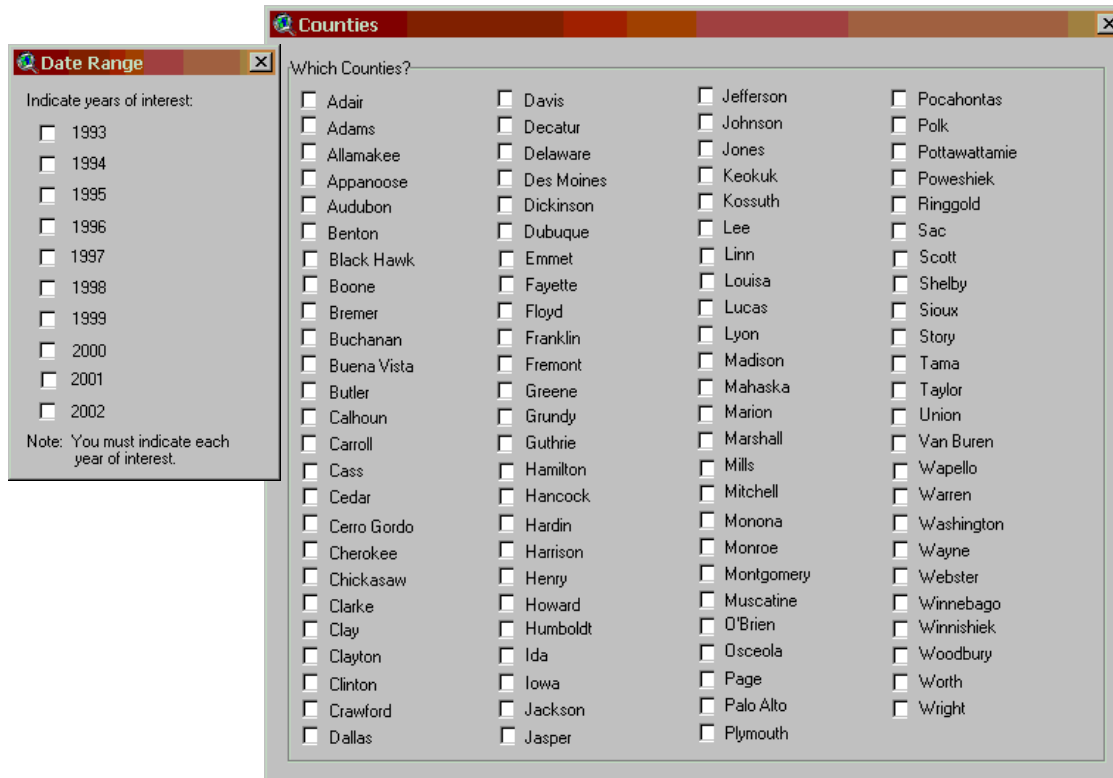http://www.dot.state.ia.us/crashanalysis/ → SAVER

Interface/GUI

Buttons:

ArcView SAVER Main
- File Commands
- Location Specification
- Attribute Specification
- Report Generation
- Display Options
- Default Specification
- Exit SAVER | Exit ArcView
- HELP! (with SAVER)

Answers
- OK | Cancel
- >> Next | << Back
- Yes | No
- Clear | All
- Main Dialog

Input:
(e.g., Driver Age range)

Numerical Specification
Lower bound:
- ● Active   ○ Inactive
- Lower bound value: [   ]
- < | <= | = | >= | > | Clear

○ and [and] ○ or

Upper bound:
- ● Active   ○ Inactive
- Upper bound value: [   ]
- < | <= | = | >= | > | Clear

Checkboxes:
(e.g., Data Years or County(ies))

Date Range
Indicate years of interest:
- ☐ 1993
- ☐ 1994
- ☐ 1995
- ☐ 1996
- ☐ 1997
- ☐ 1998
- ☐ 1999
- ☐ 2000
- ☐ 2001
- ☐ 2002

Note: You must indicate each year of interest.

Counties
Which Counties?

☐ Adair ☐ Davis ☐ Jefferson ☐ Pocahontas
☐ Adams ☐ Decatur ☐ Johnson ☐ Polk
☐ Allamakee ☐ Delaware ☐ Jones ☐ Pottawattamie
☐ Appanoose ☐ Des Moines ☐ Keokuk ☐ Poweshiek
☐ Audubon ☐ Dickinson ☐ Kossuth ☐ Ringgold
☐ Benton ☐ Dubuque ☐ Lee ☐ Sac
☐ Black Hawk ☐ Emmet ☐ Linn ☐ Scott
☐ Boone ☐ Fayette ☐ Louisa ☐ Shelby
☐ Bremer ☐ Floyd ☐ Lucas ☐ Sioux
☐ Buchanan ☐ Franklin ☐ Lyon ☐ Story
☐ Buena Vista ☐ Fremont ☐ Madison ☐ Tama
☐ Butler ☐ Greene ☐ Mahaska ☐ Taylor
☐ Calhoun ☐ Grundy ☐ Marion ☐ Union
☐ Carroll ☐ Guthrie ☐ Marshall ☐ Van Buren
☐ Cass ☐ Hamilton ☐ Mills ☐ Wapello
☐ Cedar ☐ Hancock ☐ Mitchell ☐ Warren
☐ Cerro Gordo ☐ Hardin ☐ Monona ☐ Washington
☐ Cherokee ☐ Harrison ☐ Monroe ☐ Wayne
☐ Chickasaw ☐ Henry ☐ Montgomery ☐ Webster
☐ Clarke ☐ Howard ☐ Muscatine ☐ Winnebago
☐ Clay ☐ Humboldt ☐ O'Brien ☐ Winnishiek
☐ Clayton ☐ Ida ☐ Osceola ☐ Woodbury
☐ Clinton ☐ Iowa ☐ Page ☐ Worth
☐ Crawford ☐ Jackson ☐ Palo Alto ☐ Wright
☐ Dallas ☐ Jasper ☐ Plymouth

Report:
(e.g., Count of Selected Features)

Feature Count

The count of selected features from the active themes:

Total number of crashes in selected region:
  Linn
for years:
  1998
    Linn
    Crashes: Fatal: 0 Injury: 45 PDO: 60
    Injuries: Unknown: 4 Fatal: 0 Major: 1 Minor: 12 Possible: 45
  1999
    Linn
    Crashes: Fatal: 0 Injury: 31 PDO: 48
    Injuries: Unknown: 0 Fatal: 0 Major: 2 Minor: 12 Possible: 40
  2000
    Linn
    Crashes: Fatal: 0 Injury: 34 PDO: 58
    Injuries: Unknown: 0 Fatal: 0 Major: 3 Minor: 19 Possible: 32
meeting the following criteria:
    (This feature currently not operational.)
equals:
    Crashes: Total: 276 Fatal: 0 Injury: 110 PDO: 166
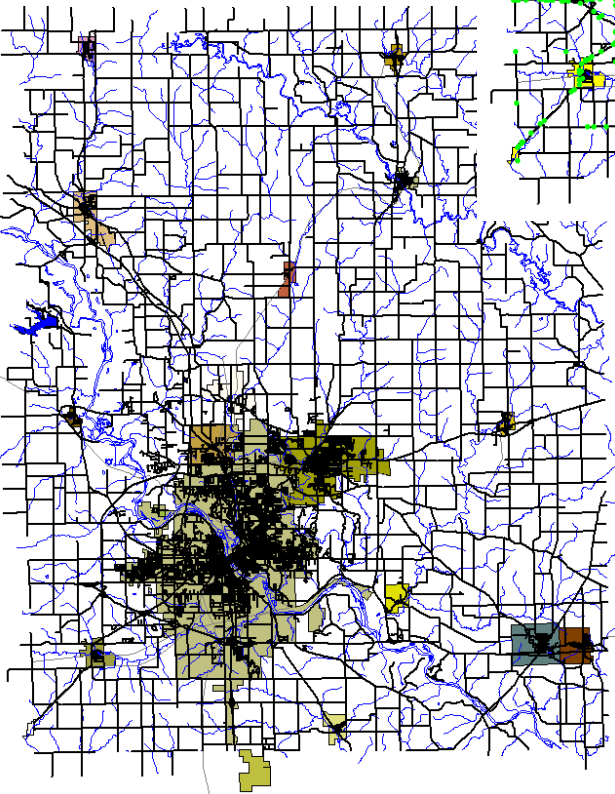   Injuries: Total: 170 Fatal: 0 Major: 6 Minor: 43 Poss/Unk: 121

Maps

Standard:

Cities color-coded:

Cities color-coded and named/
Major roads identified:

Walker
Coggon
0920
Prairieburg
Center Point
Central City
0013
Alburnett
I-380
Robins
Palo
Hiawatha
Springville
Marion
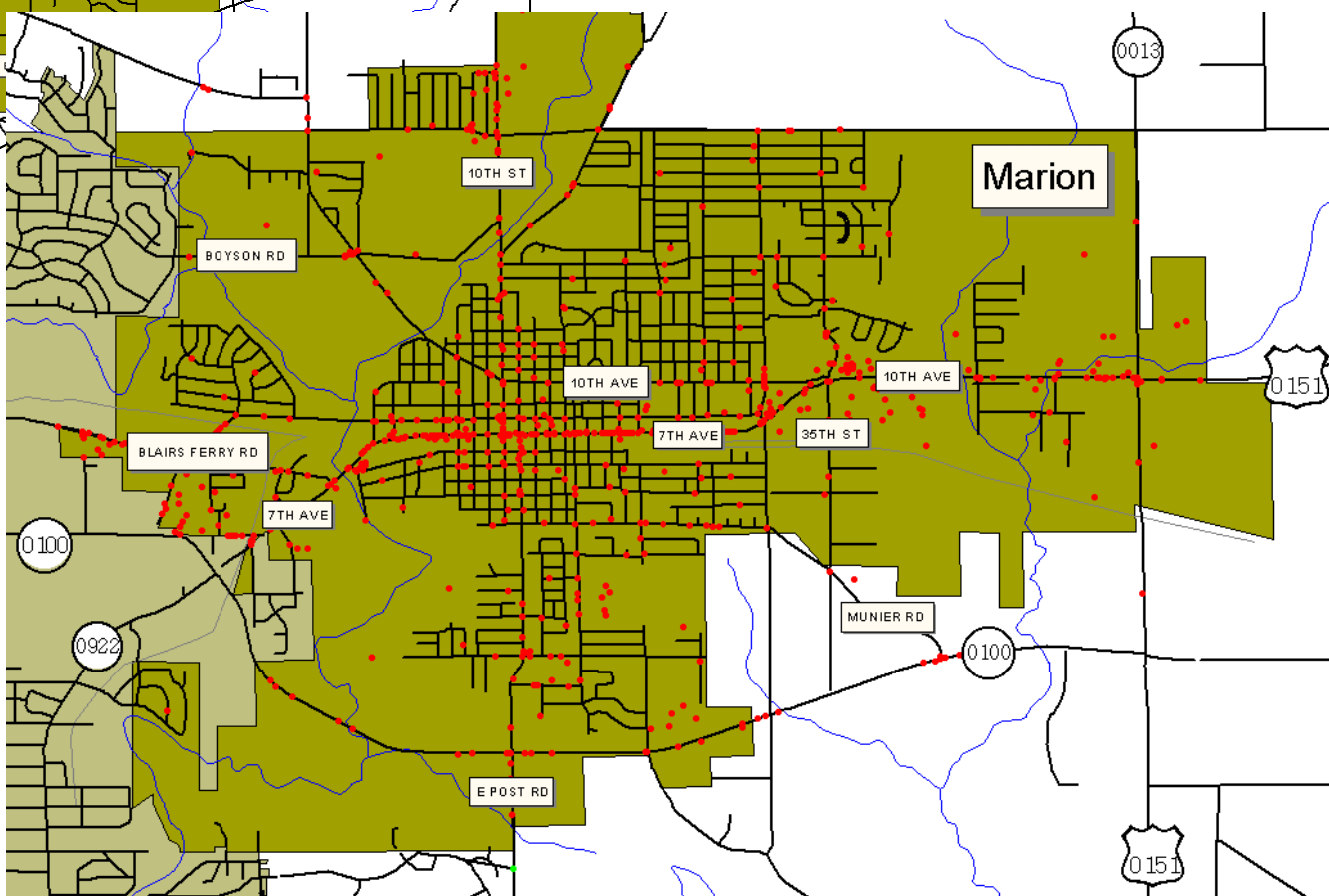0094
0100
0151
0013
0030
Bertram
Cedar Rapids
Mount Vernon
Fairfax
Lisbon
0151
0001
Ely
I-380
Shueyville

Maps

City extent w/ major streets identified:
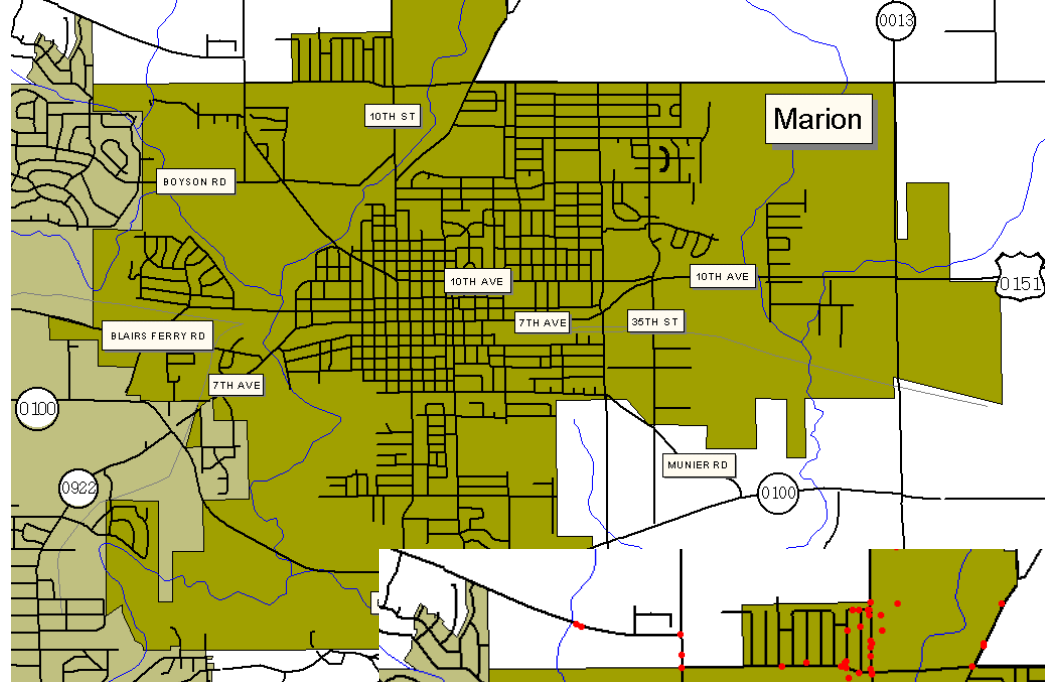
City extent w/ major streets identified AND w/ crash points (i.e., red dots):

Note: The crashes on this map are 2001-June 2002, TraCS-derived, city of Marion crashes.

Further Note: Will be able to map other TraCS data types (i.e., ECCO, MOWI, ICIS, CIRF, VSIS) as long as they have Location Tool (or x,y) coordinates

Maps

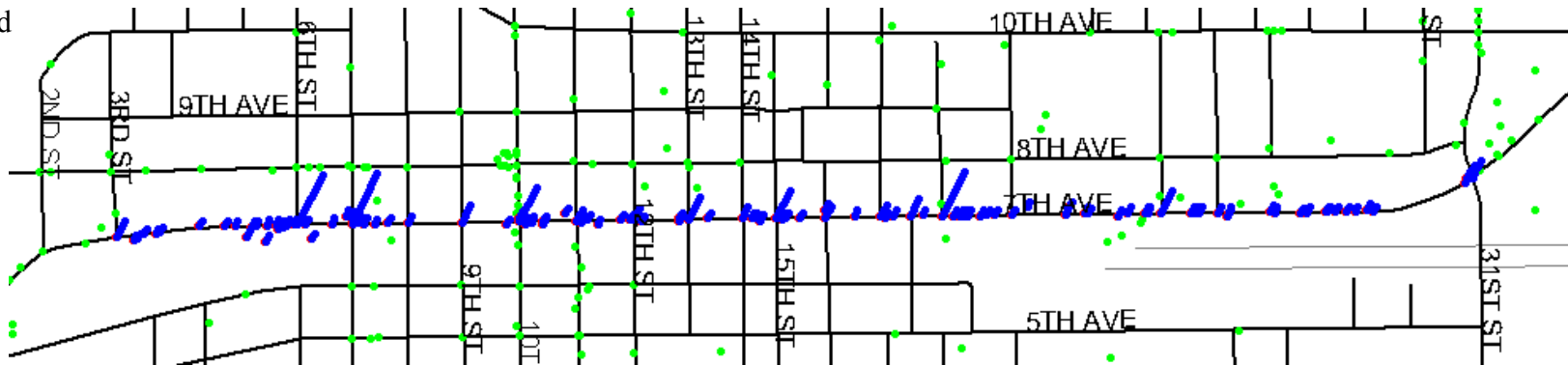Zoomed in to area of interest w/ streets identified:

Notes:

Selected crash points are noted in red. Green dots are unselected crash points.

Also, several crashes can occur at one point…so the presence of a dot doesn't necessarily equal 1 crash.
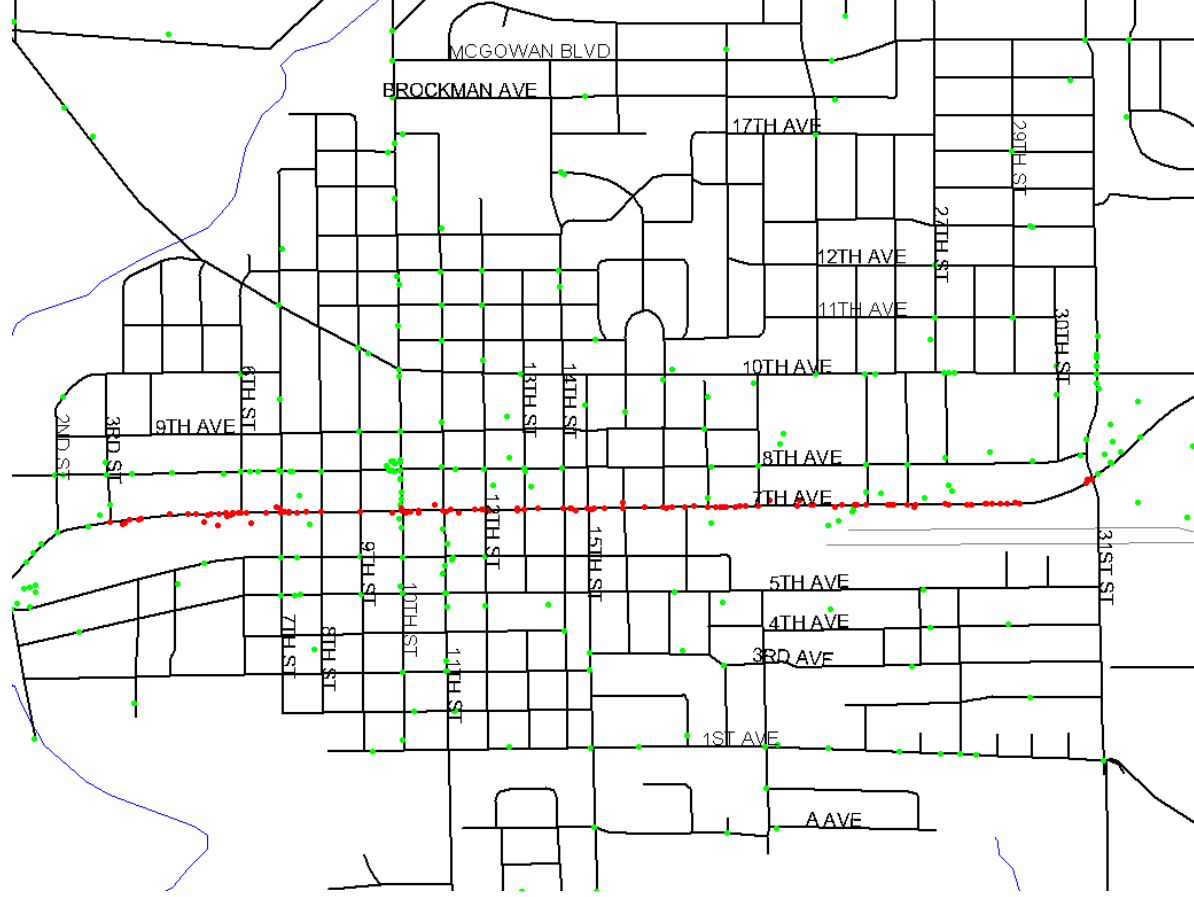
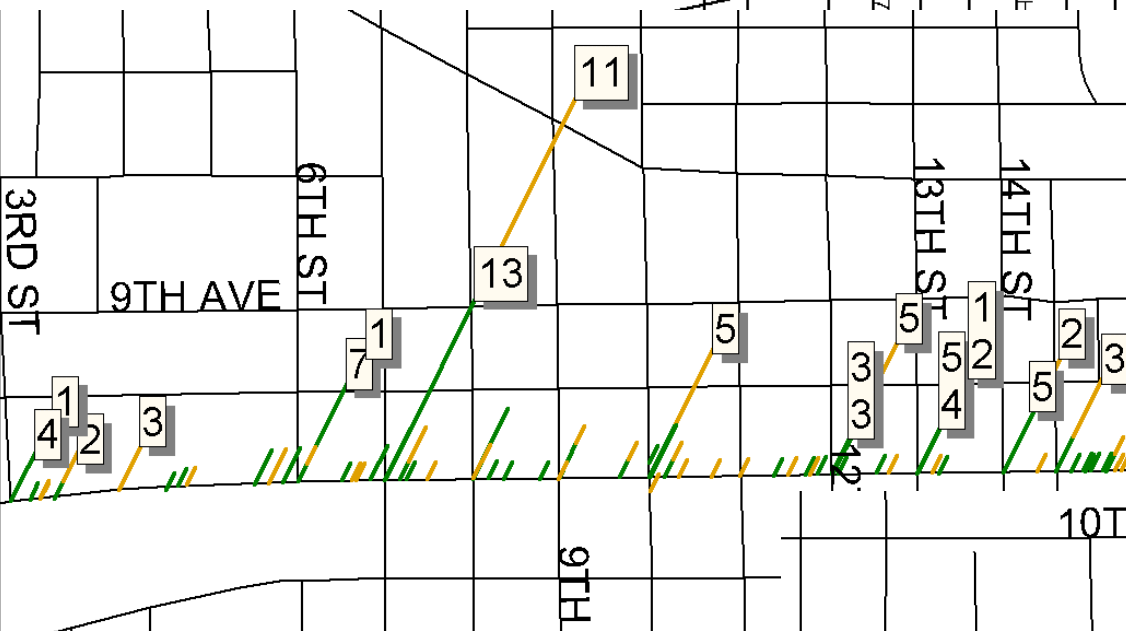"Stacking" of selected crash points displays number of crashes:

Note: Look for height of stacks and density/spread of stacks to determine possible problem areas.

Maps

Thematic "stacking" of selected crash points displays number of crashes as well as certain attributes (e.g., Crash Severity):
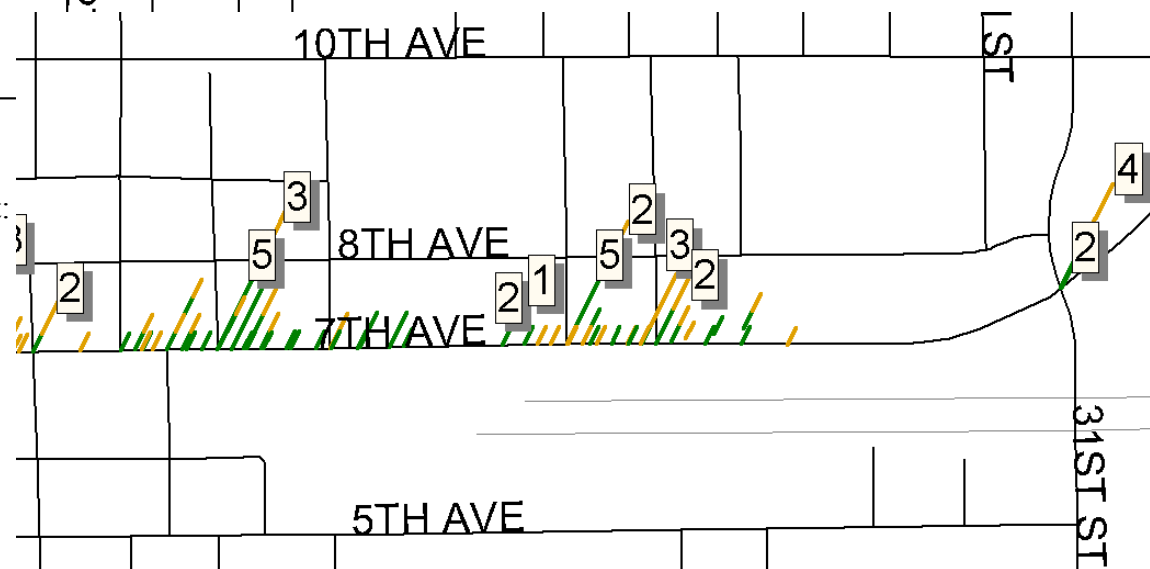
Zoomed in on western extent:

Notes:

In these maps, green = Property Damage Only crash and yellow-orange = Injury crash.

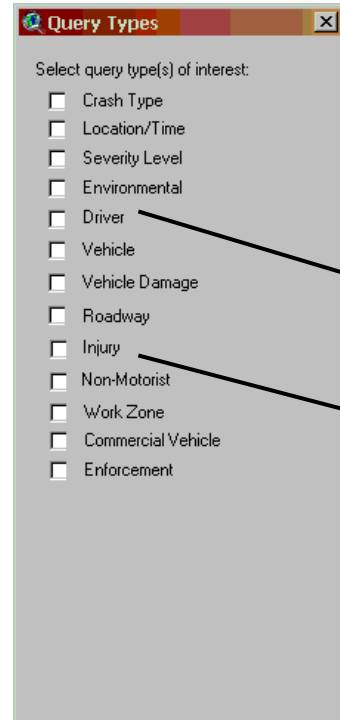"Stacking" can be done on almost any attribute in the database.

"Tagging" the stacks w/ counts (e.g., severity counts) can be done.

Zoomed in on eastern extent:

Queries

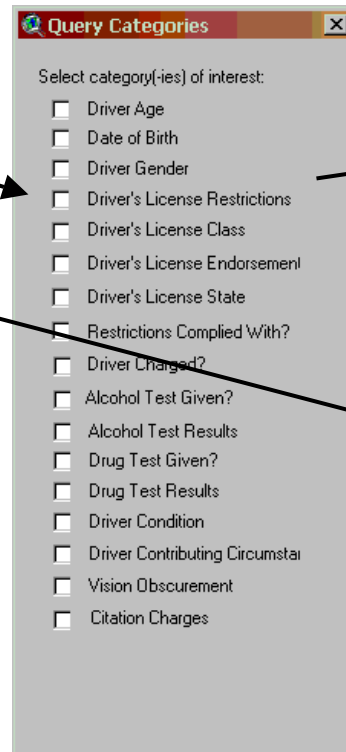Query on any database attribute
(categorized by type):

Query Types

Select query type(s) of interest:
- Crash Type
- Location/Time
- Severity Level
- Environmental
- Driver
- Vehicle
- Vehicle Damage
- Roadway
- Injury
- Non-Motorist
- Work Zone
- Commercial Vehicle
- Enforcement

e.g., Driver-related data:

Query Categories

Select category(-ies) of interest:
- Driver Age
- Date of Birth
- Driver Gender
- Driver's License Restrictions
- Driver's License Class
- Driver's License Endorsement
- Driver's License State
- Restrictions Complied With?
- Driver Charged?
- Alcohol Test Given?
- Alcohol Test Results
- Drug Test Given?
- Drug Test Results
- Driver Condition
- Driver Contributing Circumstan
- Vision Obscurement
- Citation Charges

e.g., Injured Person data:

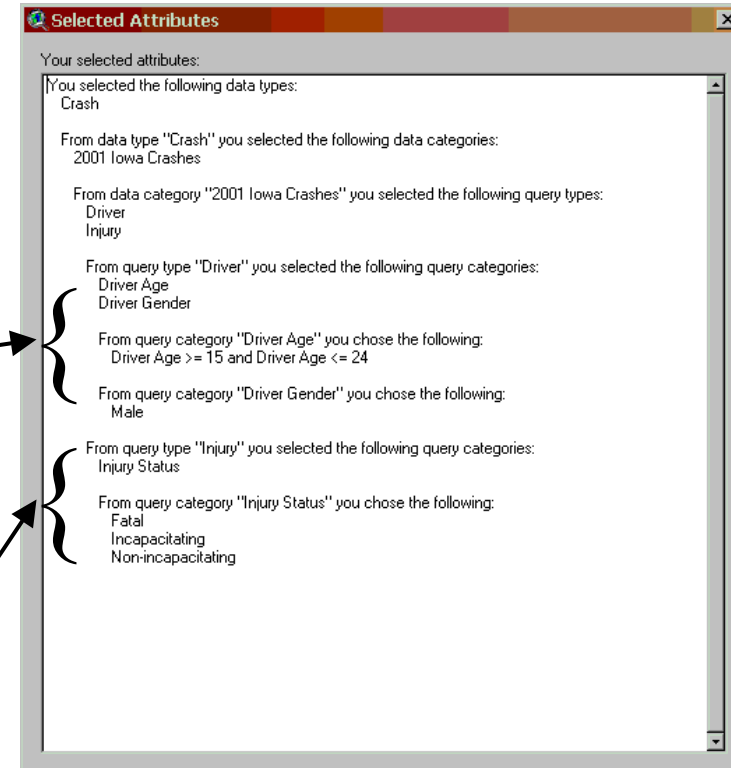**Query Categories**

Select category(-ies) of interest:
- Injured Age
- Date of Birth
- Injured Gender
- Injury Severity
- Occupant Protection
- Injury Status
- Injury Area
- Seating Position
- Ejection
- Airbag Deployment
- Airbag Switch Status
- Ejection Path
- Trapped
- Unit No.
- Transported To
- Transported By

Report of Query choices:

Selected Attributes

Your selected attributes:

You selected the following data types:
  Crash

  From data type "Crash" you selected the following data categories:
    2001 Iowa Crashes

    From data category "2001 Iowa Crashes" you selected the following query types:
      Driver
      Injury

    From query type "Driver" you selected the following query categories:
      Driver Age
      Driver Gender
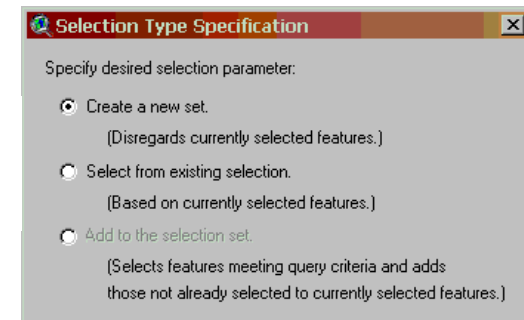
    From query category "Driver Age" you chose the following:
      Driver Age >= 15 and Driver Age <= 24

    From query category "Driver Gender" you chose the following:
      Male

    From query type "Injury" you selected the following query categories:
      Injury Status

    From query category "Injury Status" you chose the following:
      Fatal
      Incapacitating
      Non-incapacitating

i.e., All crashes that include 15-24 Males **AND** Injuries that were Fatal, Incapacitating, or Non-incapacitating.

Use existing selection set (e.g., selected crashes) OR begin anew:

Selection Type Specification

Specify desired selection parameter:

- ⦿ Create a new set.
      (Disregards currently selected features.)

- ○ Select from existing selection.
      (Based on currently selected features.)

- ○ Add to the selection set.
      (Selects features meeting query criteria and adds those not already selected to currently selected features.)

Queries

Selection set changes…

From:
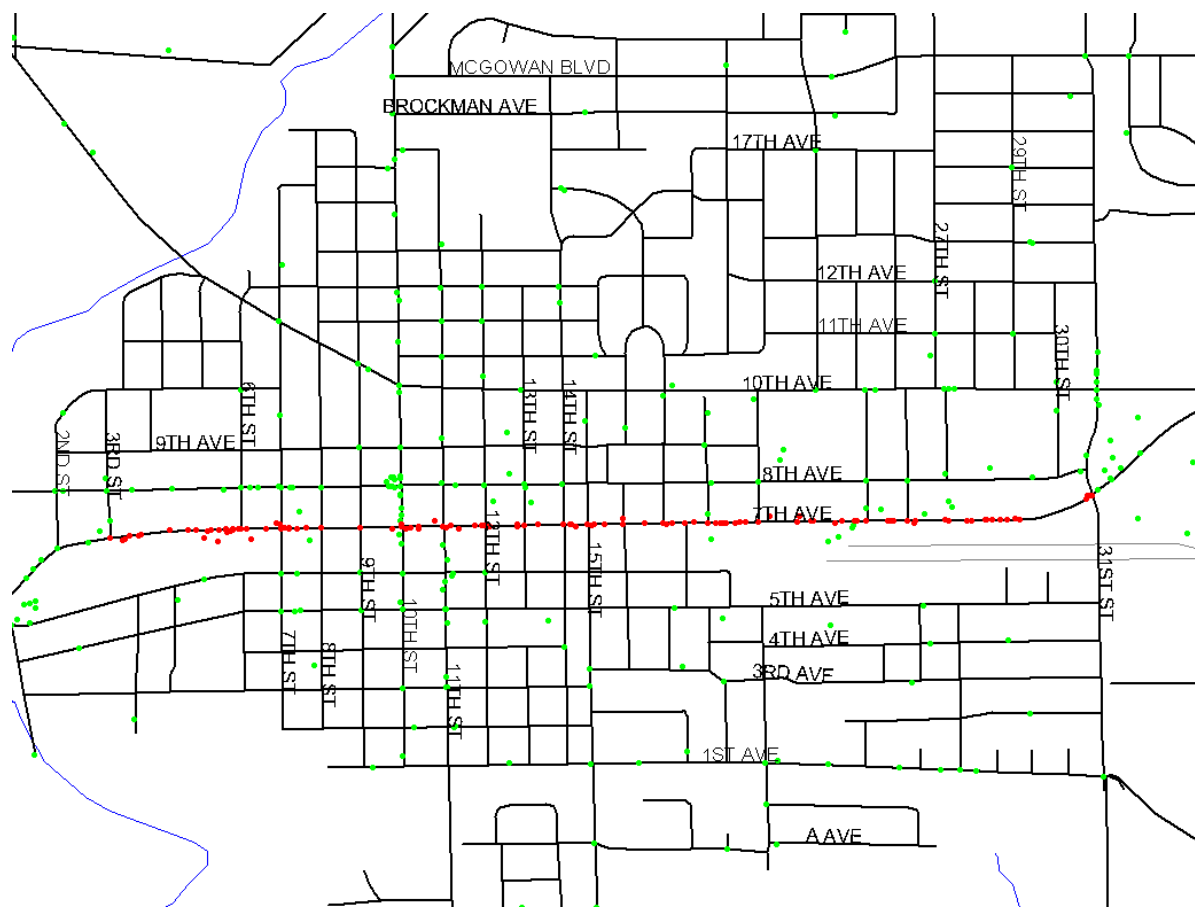
To:
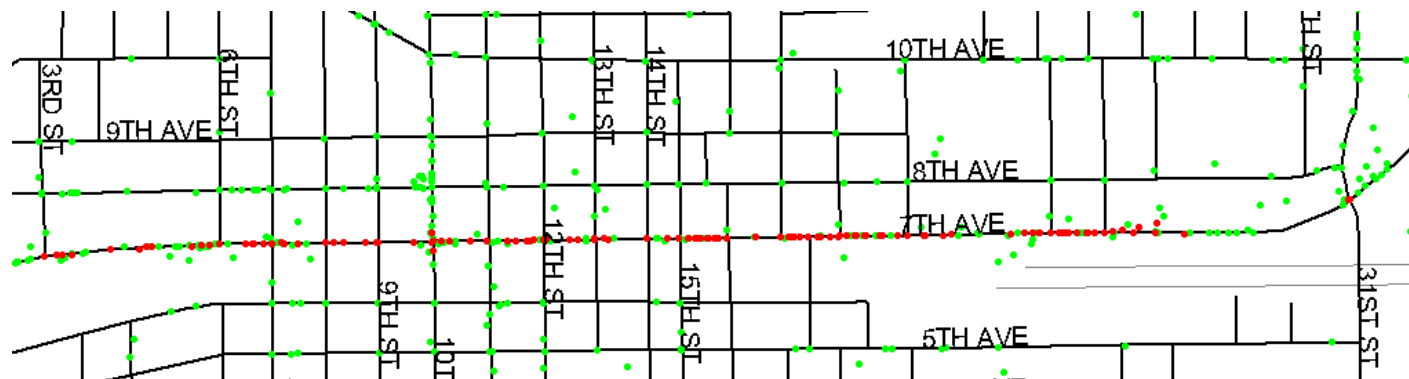
Note: There are green dots along the selected route after the query. There may even be red dots on top of green dots or vice versa. Another "stacking" would be advisable.

Reports

Select reports similarly…e.g.,

Report Selection

Select report(s) of interest:

- [ ] Accident Type Injury Summary Sheet
- [ ] Collision Type Injury Summary Sheet
- [ ] Driver Age Injury Summary Sheet
- [ ] Driver Condition Injury Summary Sheet
- [ ] Driver Gender Injury Summary Sheet
- [ ] Fixed Object Struck Injury Summary Sheet
- [ ] Injured Age Injury Summary Sheet
- [ ] Injured Gender Injury Summary Sheet
- [ ] Injury Severity Injury Summary Sheet
- [ ] Intersection Class Injury Summary Sheet
- [ ] Light Conditions Injury Summary Sheet
- [ ] Major Cause Injury Summary Sheet
- [ ] Month Injury Summary Sheet
- [ ] Road Class Injury Summary Sheet
- [ ] Roadway Characteristics Injury Summary Sheet
- [ ] Rural/Urban Injury Summary Sheet
- [ ] Speed Limit Injury Summary Sheet
- [ ] Surface Conditions Injury Summary Sheet
- [ ] Traffic Controls Injury Summary Sheet
- [ ] Traffic Flow Injury Summary Sheet
- [ ] Trafficway Type Injury Summary Sheet
- [ ] Vehicle Action Injury Summary Sheet
- [ ] Vehicle Type Injury Summary Sheet
- [ ] Injury Summary Sheet
- [ ] Intersection Summary Sheet

- [ ] Truck Summary Sheet

Selected reports:

Selected Reports

Your selected reports:

You selected the following data types:
Crash

From data type "Crash" you selected the following data categories:
1979 Iowa Crashes

From data category "1979 Iowa Crashes" you selected the following report types:
Case Based
Year Based

From report type "Case Based" you selected the following reports:
Brief

From report type "Year Based" you selected the following reports:
Driver Condition Injury Summary Sheet
Major Cause Injury Summary Sheet

Note: The selected reports are run on the active selection set (i.e., the red dots).

Reports

Case-based:

_Case Based: Brief

Crash_Key	CaseNumber	County	Acc_Type	Coll_Type	MajorCause	CSeverity	PropDmg	Day	Date	Time	TravelDir	Veh_Action	ISeverity
1998000529	8000602	Linn	Collision: Vehicle in Traffic		Inexperienced Driver	Property Damage Only	2000	Friday	10298	750	North	Changing Lanes	
											North	Going Straight	
1998000728	8000839	Linn	Collision: Vehicle in Traffic		Inattentive/Distracted	Property Damage Only	2000	Saturday	10398	900	East	Stopped in Traffic Lane	
											East	Going Straight	
1998001684	8001986	Linn	Collision: Vehicle in Traffic	Broadside/Right Angle	Ran Traffic Signal	Injury	6000						
1998001708	8002015	Linn	Collision: Vehicle in Traffic		Following Too Close	Property Damage Only	1250						
1998001876	8002221	Linn	Collision: Vehicle in Traffic		Unknown	Property Damage Only	2992						
1998003050	8003687	Linn	Collision: Vehicle in Traffic	Broadside/Left Entering	Ran Traffic Signal	Injury	5000						
1998004686	8005690	Linn	Collision: Fixed Object	Single	Speed Too Fast for Conditions	Property Damage Only	7000						
1998004744	8005761	Linn	Collision: Vehicle in Traffic	Broadside/Right Angle	FTYROW from Driveway	Property Damage Only	1500						
1998004870	8005912	Linn	Collision: Vehicle in Traffic	Rear End	Inattentive/Distracted	Property Damage Only	3000						
1998006087	8007453	Linn	Collision: Vehicle in Traffic	Rear End	Following Too Close	Property Damage Only	1900						
1998006120	8007500	Linn	Collision: Vehicle in Traffic	Head-on/Left Entering	Ran Traffic Signal	Injury	4000						
1998007217	8008895	Linn	Collision: Vehicle in Traffic	Rear End/Left Turn	Inattentive/Distracted	Injury	2500						

Year-based Major Cause:

_Year Based: Major Cause Injury Summary Sheet (Textual)

Year	MajorCause	TotalCrash	FatalCrash	InjCrash	PDOCrash	TotalInj	Fatalities	MajorInj	MinorInj	PossInj	UnkInj
1998	Ran Traffic Signal	6		5	1	10			3	7	
	Left of Center - Not Passing	2			2						
	FTYROW from Yield Sign	1		1		1				1	
	FTYROW Making Left Turn	8		3	5	3	1			2	
	FTYROW from Driveway	4		1	3	3				3	
	Speed Too Fast for Conditions	11		5	6	9			2	7	
	Improper Lane Change	1			1						
	Following Too Close	6		1	5	1				1	
	No Signal/Improper Signal	1			1						
	Failure to Have Control	18		10	8	14			2	8	4
	Inattentive/Distracted	6		2	4	2				2	
	Vision Obscured	2		1	1	1				1	
	Inexperienced Driver	1			1						
	Other	7		2	5	2				2	
	Unknown	31		14	17	16			5	11	
1999	Ran Traffic Signal	8		3	5	5			2	3	
	Ran Stop Sign	1			1						
	Passing - Interfered with Other	3			3						
	Left of Center - Not Passing	1			1						
	FTYROW at Uncontrolled Inter	1			1						
	FTYROW from Stop Sign	5		1	4	1				1	
	FTYROW Making Left Turn	11		4	7	8			4	4	
	FTYROW from Driveway	4		2	2	3				3	
	FTYROW Other	1			1						
	Speed Too Fast for Conditions	2		2		4	1	1		2	
	Exceeding Speed Limit	2		2		6				6	
	Improper Lane Change	2			2						
	Following Too Close	6		3	3	3			1	2	
	Failure to Have Control	9		5	4	9			2	7	
	Inattentive/Distracted	2			2						
	Driver Confused	1			1						
	Inexperienced Driver	1			1						
	Other	1			1						
	Unknown	18		9	9	15			1	2	12
2000	Ran Traffic Signal	3		1	2	1				1	
	Passing - Interfered with Other	1			1						
	Left of Center - Not Passing	1		1		4			3	1	
	FTYROW at Uncontrolled Inter	2		2		2			1	1	
	FTYROW from Stop Sign	4		1	3	1	1				
	FTYROW Making Left Turn	12		6	6	6			4	2	
	FTYROW from Driveway	3			3						
	FTYROW Other	2		2		3			1	2	
	Speed Too Fast for Conditions	3		1	2	2			1	1	
	Exceeding Speed Limit	1			1						
	Improper Turn	1			1						
	Improper Lane Change	4			4						
	Following Too Close	8		3	5	6					6
	Improper Backing	1			1						
	Failure to Have Control	17		8	9	13			3	10	
	Inattentive/Distracted	2		1	1	1					1
	Vision Obscured	2			2						
	Inexperienced Driver	1			1						
	Other	2		1	1	1				1	
	Unknown	22		7	15	14			2	5	7

Year-based Driver Condition:

_Year Based: Driver Condition Injury Summary Sheet (Textual)

Year	Driv_Cond	TotalCrash	FatalCrash	InjCrash	PDOCrash	TotalInj	Fatalities	MajorInj	MinorInj	PossInj	UnkInj
1998	Apparently Normal	105		45	60	62	1		12	45	4
	Fatigued	2			2						
	Drinking (Not Impaired)	1		1		1				1	
	Unknown	7		2	5	2			1	1	
1999	Apparently Normal	79		31	48	54	2		12	40	
	Physical Defect	1		1		2				2	
	Infirmities of Age	2			2						
	Drinking (Impaired)	1		1		1				1	
	Unknown	10		3	7	5			2	3	
2000	Apparently Normal	91		34	57	54	3		19	32	
	Fatigued	1		1		4				4	
	Apparently Asleep	1			1						
	Ill	1		1		2	2				
	Drinking (Impaired)	1			1						
	Other	1			1						
	Unknown	8		4	4	4			3	1	

Note: The number of available reports will increase over time and as user suggestions are received.

SAVER

- Requires ArcView 3.2 or 3.3
    - Program file is free but needs ArcView (i.e., SAVER runs within ArcView)
    - Plans for acquiring/disbursing copies of ArcView to agencies (see Joyce's handout)

- SAVER is in **continual** development
    - Base features exist
    - Distribution in progress → targeted based on prioritized list (see Joyce's handout)
    - Further refinement of:
        - Reports
        - Interface
        - Data types (i.e., beyond crashes)
    - Anticipate Jan. 2003 completion for "canned" reports and standard data types (e.g., other TraCS data and roadway features)
    - Interface is a continual effort as user comments are received
    - Future version, Visual Basic (VB)-SAVER, will not require ArcView (~ $100/free?)

- SAVER works w/ TraCS local databases
    - TraCS → SAVER converter: Converts from Access to DBase
    - DBase ~ 1/100 storage space of Access (e.g., Marion TraCS ~ 500 MB, Marion SAVER (just crashes) ~ 5 MB)
    - Only converts crashes currently → Jan. 2003: conversion of other TraCS data?!?